



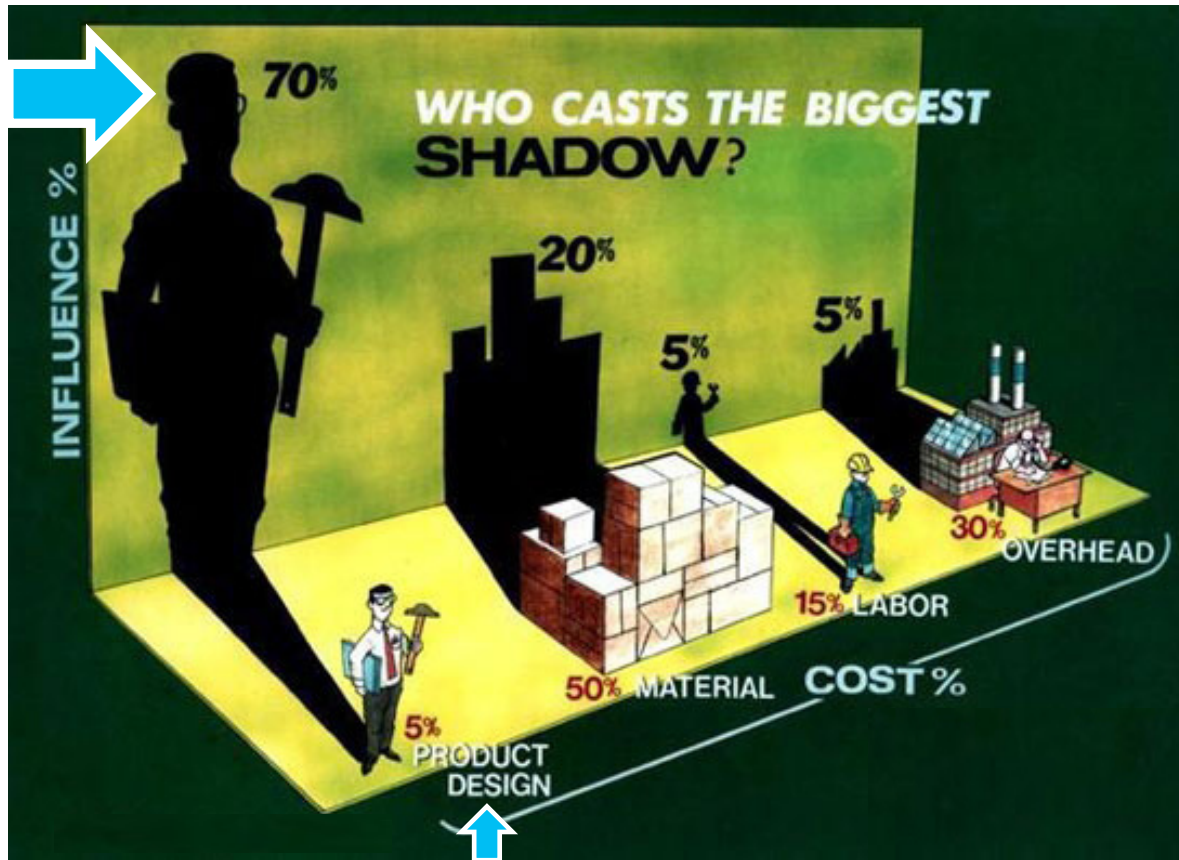
# Build4Scale

Mod 0 Course Introduction

# Motivation

*Why is design important?*

*Decisions made during the **design process** have significant effects on the success (or failure) of your product*

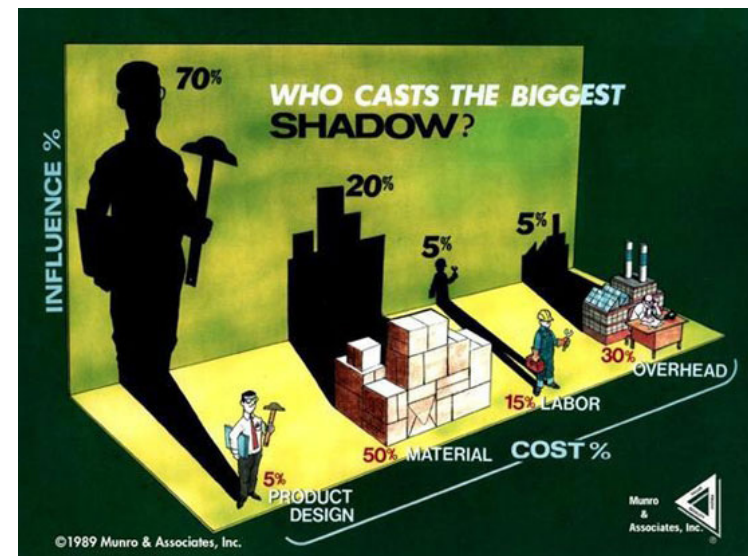


Introduction

# Why Use Build4Scale?

*Ask the right questions at the right time*

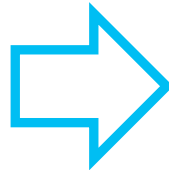
- Key considerations so you will make better decisions earlier, saving you time and money
- Knowing what to expect when moving from prototype to operating at scale means you will be more prepared
- Materials can be followed consecutively or ad-hoc depending on your needs



# Build4Scale Teaches Manufacturing Fundamentals



*Now that you've built a successful prototype, you want to begin mass producing your product*

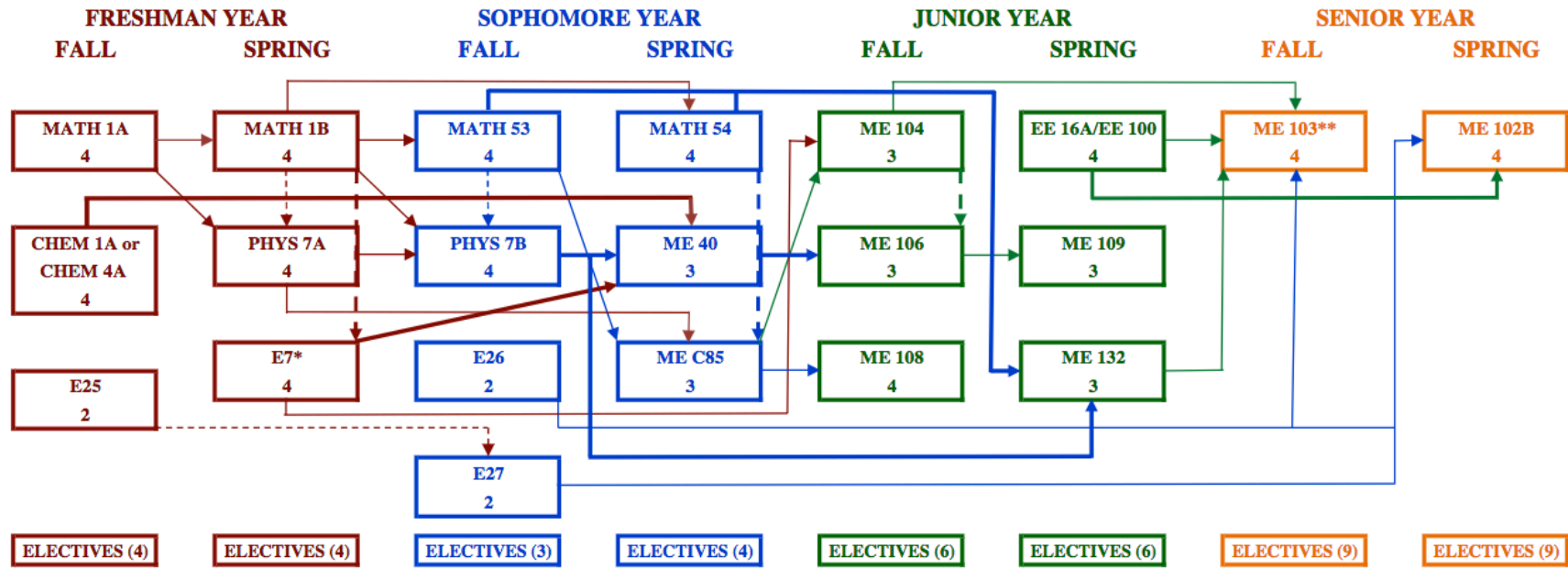


# Build4Scale Teaches Manufacturing Fundamentals



*Except, you didn't take that class.....*

## Mechanical Engineering Undergraduate Curriculum



# Module Outline

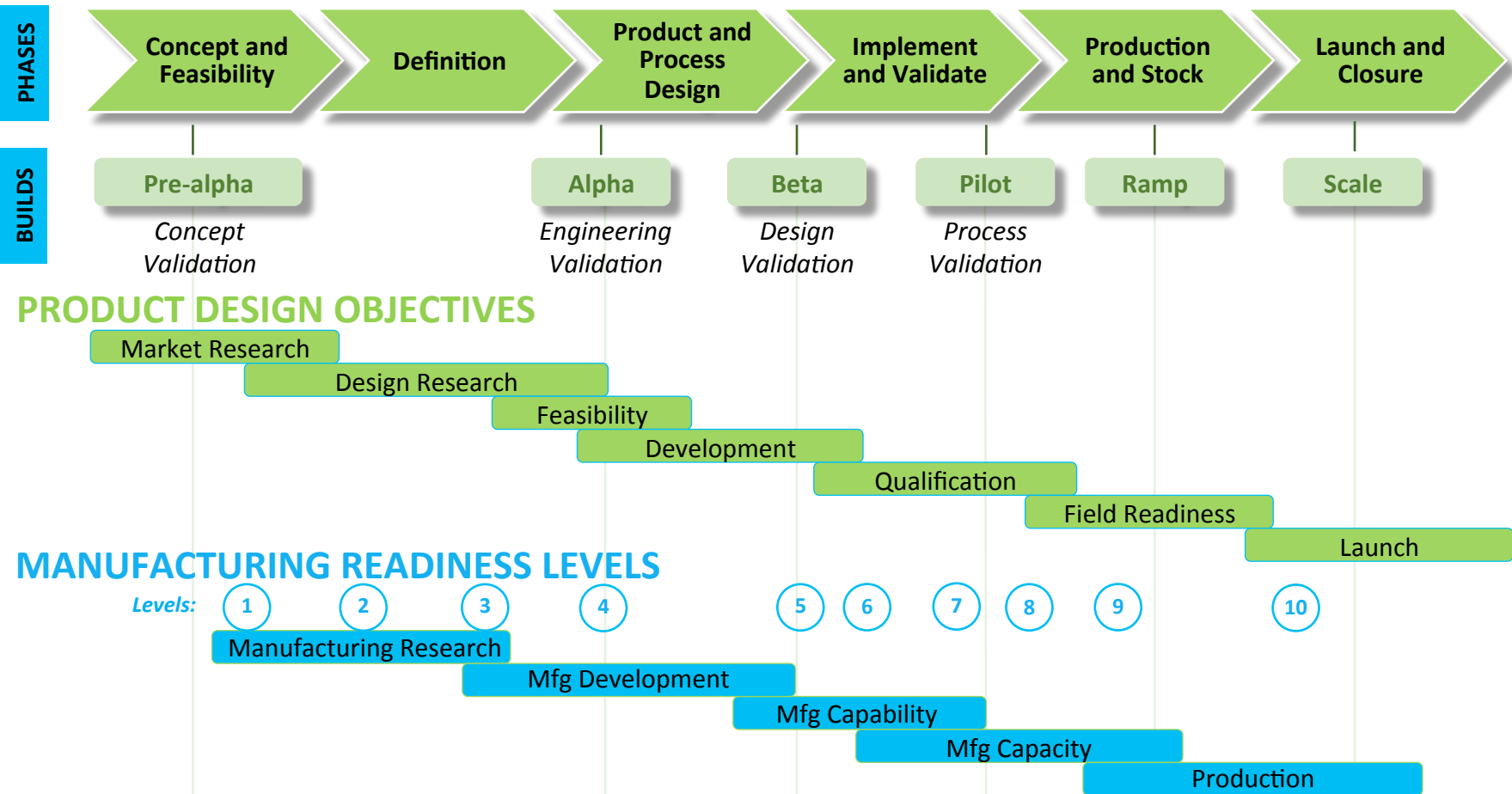


- Product design versus manufacturing level
- Where you should be: Module 1
- Where you are going: Modules 2–7



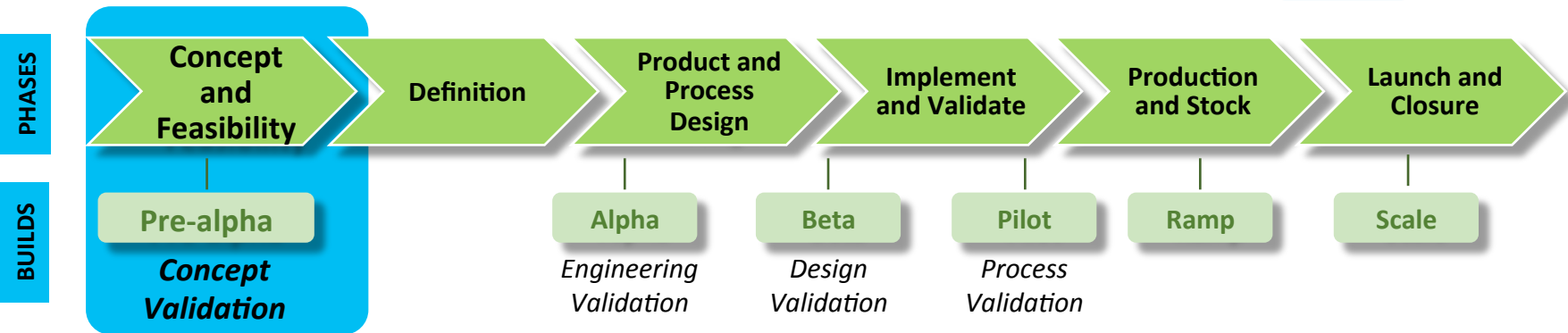
# Product And Design Process

*Versus manufacturing readiness levels (MRLs)*



Introduction

# Where You Should Be

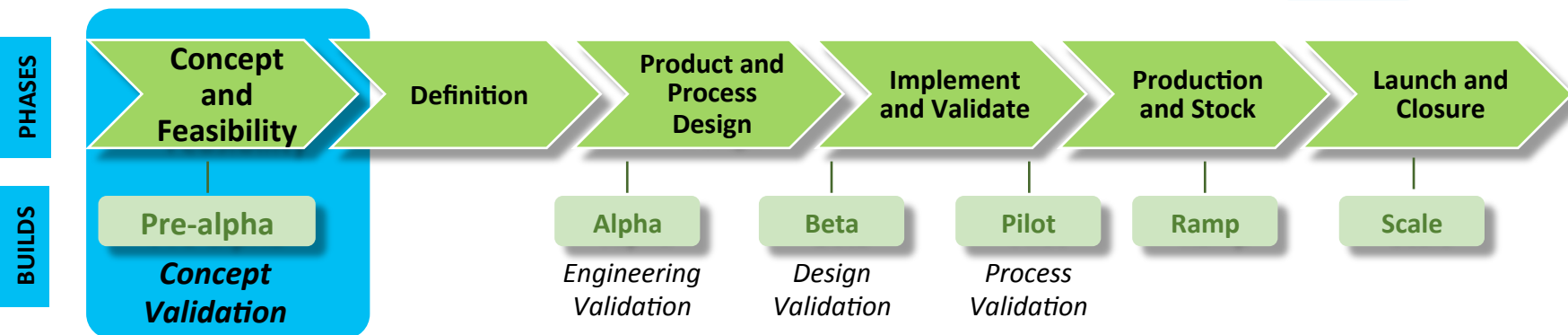


- At this point, you should have a clear understanding of your customer and your market including the customer's needs and your value proposition
- You should also have a prototype that looks and functions like your proposed product; not all components will be production-ready, your prototype should allow customers to see and understand your value

*The prototype should confirm the feasibility of your concept*



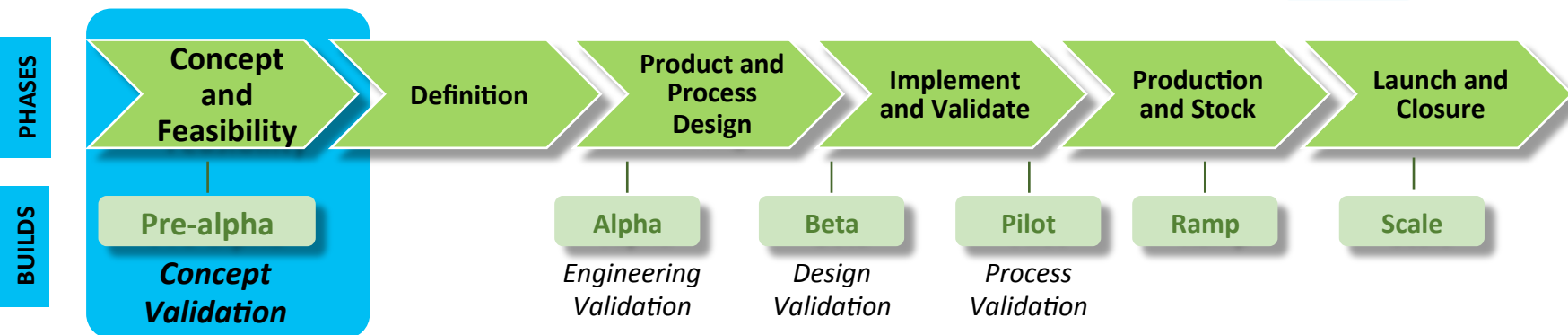
# Where You Are Going



- ❑ Now you're ready to move along the path to product launch
- ❑ Decisions previously made for expediency now need to be re-examined for their suitability at scale
- ❑ Solutions that worked in the lab need to be evaluated for their production time and cost at higher volume

# Self-Assessment

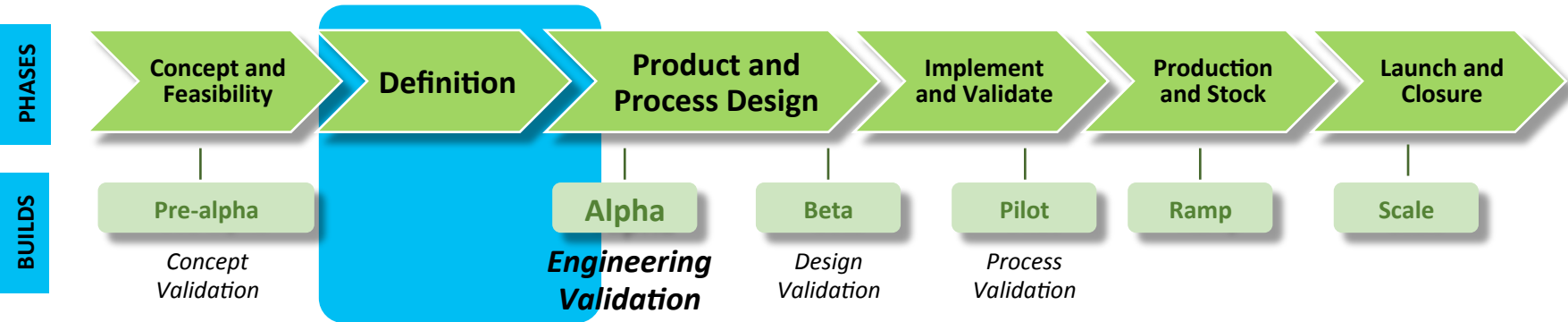
## Module 1



- Module 1 allows you to assess your needs and determine where you might want to start in the Build4Scale training

# Detailed Design Package

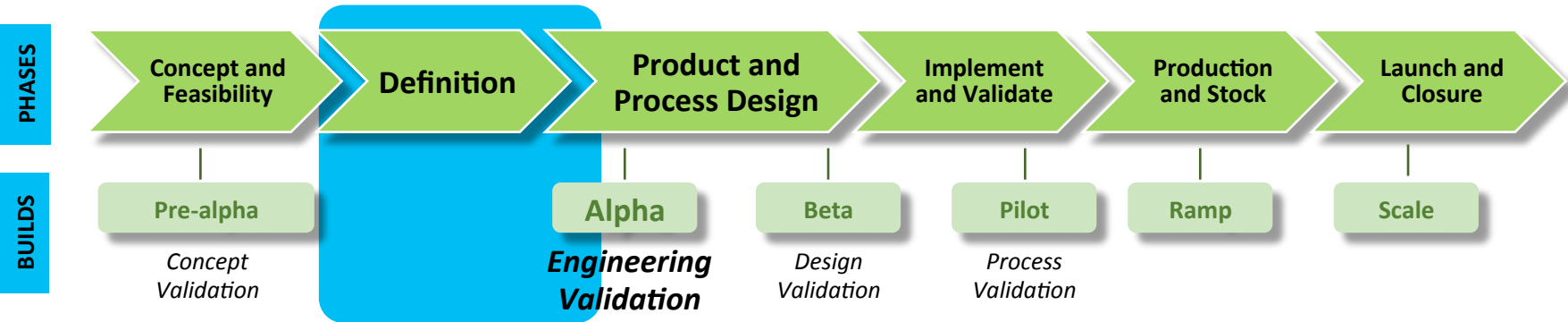
## Module 2



- Module 2 provides an overview of the tools needed to turn your prototype into an actual design package:
  - Module 2A:** describes how to create a bill of materials (BOM) and bill of process (BOP), which specify the components and processes needed for your product
  - Module 2B:** discusses product lifecycle management (PLM) tools that allow you to track design documents, create the BOM, and ensure that designs communicate the necessary information

# Detailed Design Package

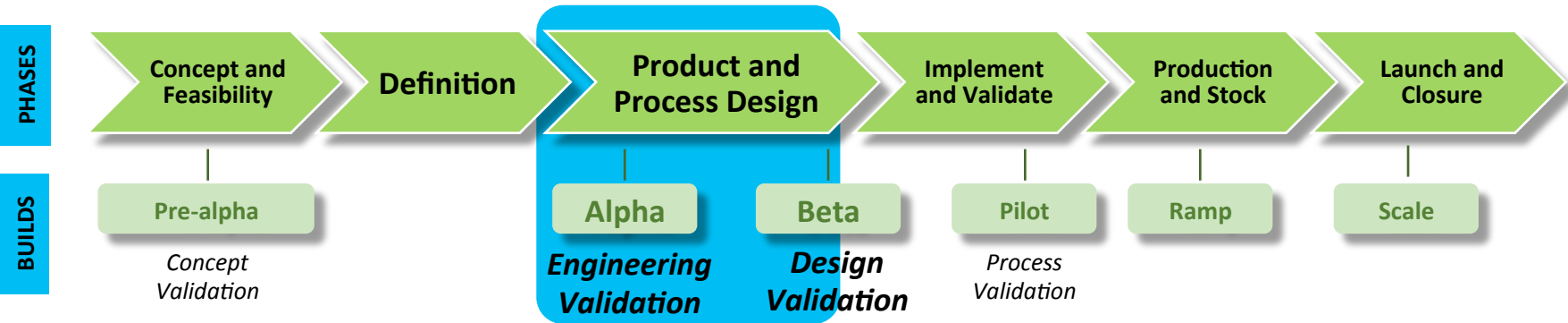
## Module 2 (cont.)



- Module 2 provides an overview of the tools needed to turn your prototype into an actual design package: (cont.)
  - Module 2C:** describes how to create quality standards from customer needs and determine what can go wrong with your design (and how to fix it)

# Design For Manufacturing

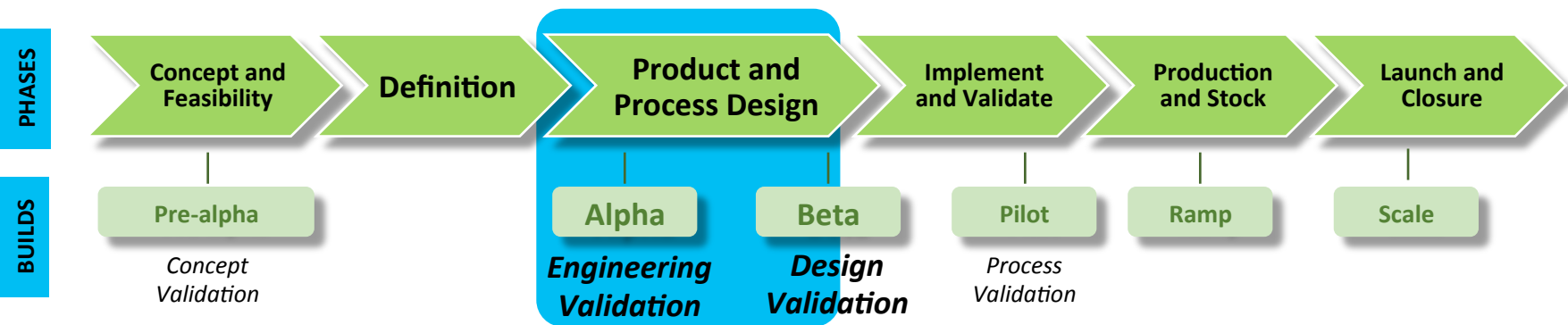
## Module 3



- Module 3 focuses on ensuring that your materials and manufacturing choices are economically viable and meet customer needs:
  - Module 3A:** describes how to determine the costs for your product and ensure they are in line with the market (this serves as the foundation for other design decisions)
  - Module 3B:** provides background information on different material classes and highlights properties that ensure selected materials meet customer needs economically

# Design For Manufacturing

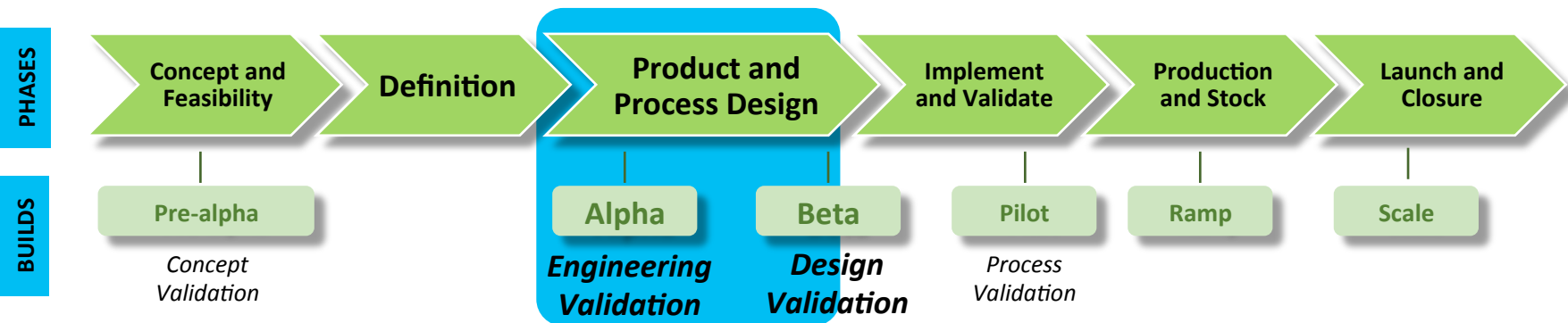
## Module 3 (cont.)



- Module 3 focuses on ensuring that your materials and manufacturing choices are economically viable and meet customer needs: (cont.)
  - Module 3C:** describes alternative manufacturing processes and their cost and investment implications

# Design For Assembly/Reliability

## Module 3 (cont.)

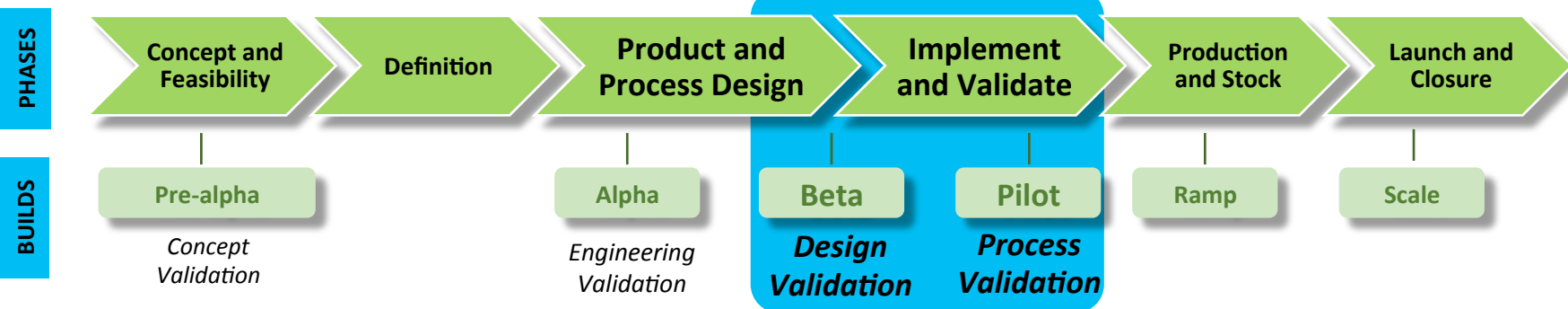


- Module 3 covers designing your product and processes:
  - Module 3D:** provides guidelines to ensure that products are designed to be manufactured and assembled at low cost with high quality
  - Module 3E:** describes ways to assess your product and ensure that it doesn't fail prior to the end of its useful life
  - Module 3F:** provides an introduction on how to design and fabricate electronic components that meet customer needs and provide robust performance



# Beta Prototype And Test Plan

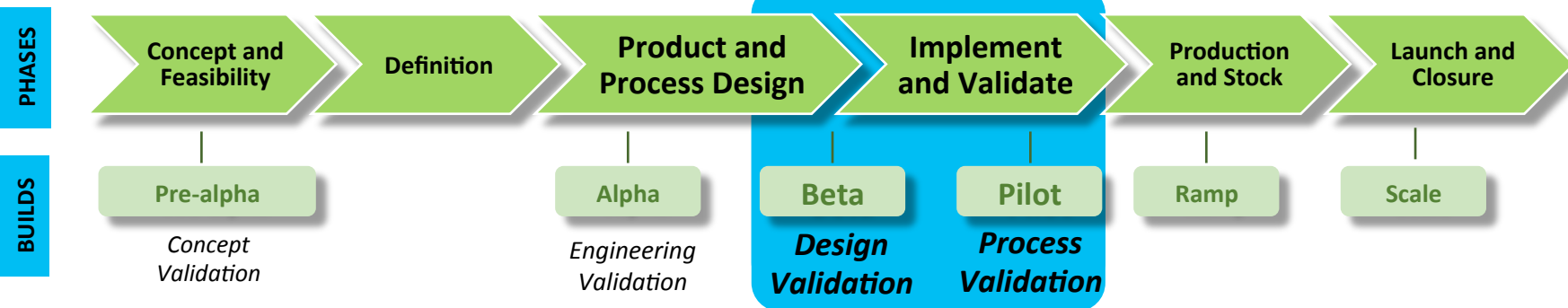
## Module 4



- Module 4 describes how to use your beta prototype most efficiently
- This module helps you determine which questions you want answered, how best to get that data, and how to move forward to product launch:
  - Module 4A:** highlights questions of interest to your customer prior to scaling production and how you can use prototypes to answer them

# Beta Prototype And Test Plan

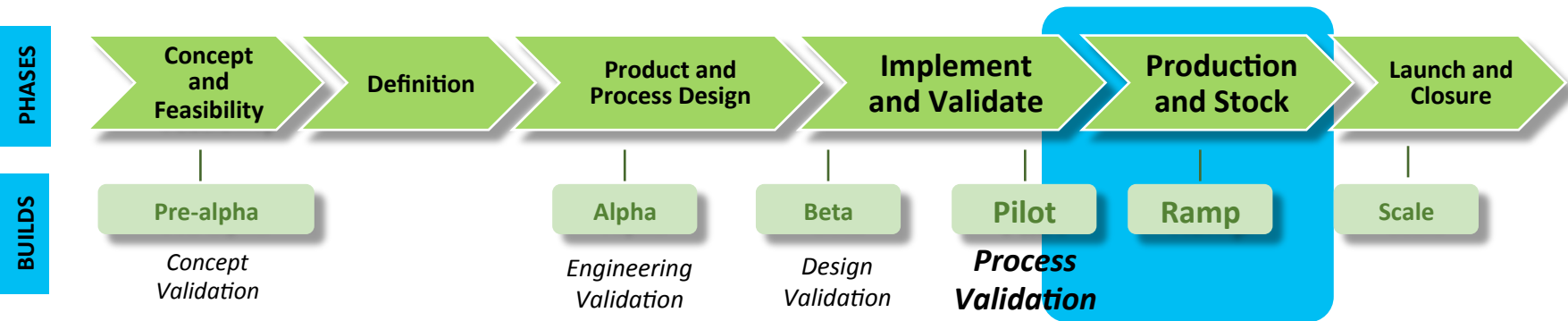
## Module 4 (cont.)



- Module 4 describes how to use your beta prototype most efficiently: (cont.)
  - Module 4B:** discusses the importance of using actual manufacturing and assembly processes and how to ensure that suppliers provide the necessary components
  - Module 4C:** discusses ways to assess the beta prototype and trade-offs associated with alternative assessment methods
  - Module 4D:** discusses how to document feedback and issues associated with design changes

# Communication And Selection

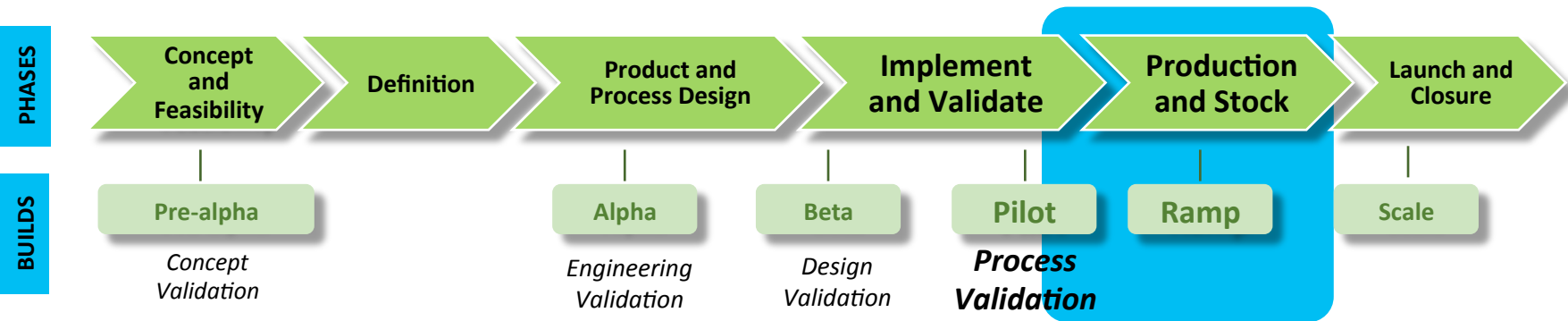
## Module 5



- Module 5 describes how to build the supply-and-distribution plan for your product
- This module helps you to select and negotiate with vendors and ensure that your product reaches the customer on-time and in full:
  - Module 5A:** discusses key questions related to making or buying a component and selecting and negotiating with suppliers

# Negotiation And Distribution

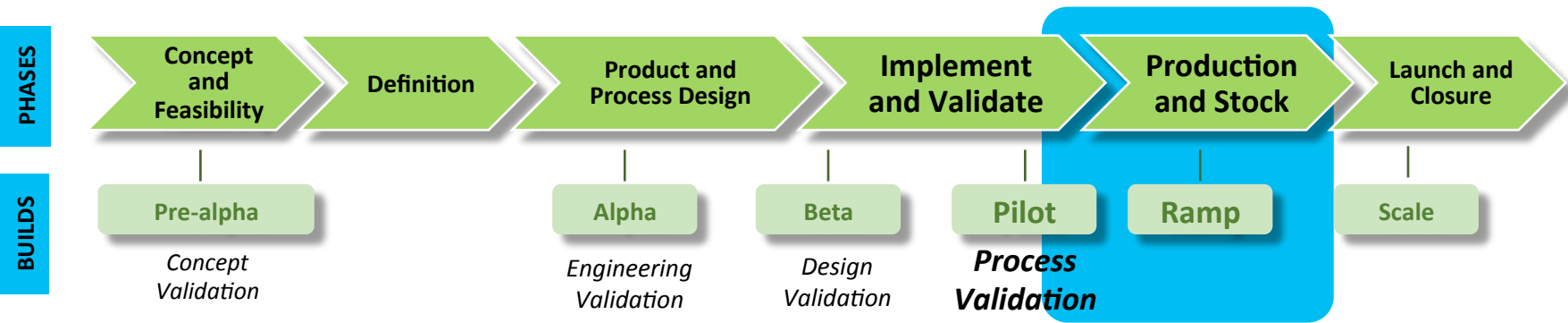
## Module 5 (cont.)



- Module 5 describes how to build the supply-and-distribution plan for your product: (cont.)
  - Module 5B:** discusses use of enterprise resource planning (ERP) and manufacturing resource planning (MRP-2) tools and how to select the tool you need
  - Module 5C:** describes how to use alternative forecasting methods and integrate your enterprise resource planning (ERP) system to ensure that you deliver the necessary product to your customers on time

# Negotiation And Distribution

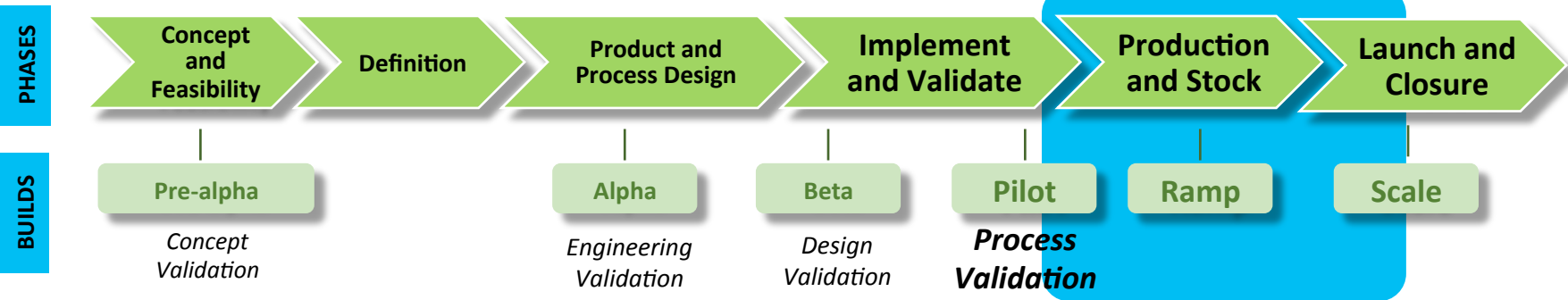
## Module 5 (cont.)



- Module 5 describes how to build the supply-and-distribution plan for your product: (cont.)
  - Module 5D:** describes how to ship your product economically while meeting customer and regulatory requirements

# Regulation And Certification

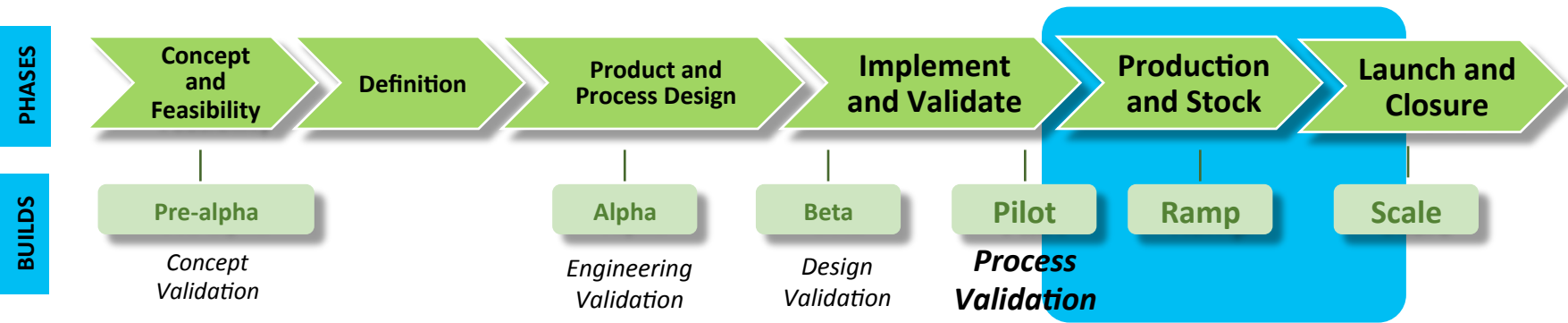
## Module 6



- Module 6 discusses the regulatory, certification, and quality needs of your product
- This module helps you determine what certification your product needs, which regulatory regimes your product is subject to, and how to ensure consistent production quality for your manufacturing processes:
  - Module 6A:** discusses the differences between regulation and certification and the effects both have on your product launch

# Regulation/Industry Standards

## Module 6 (cont.)

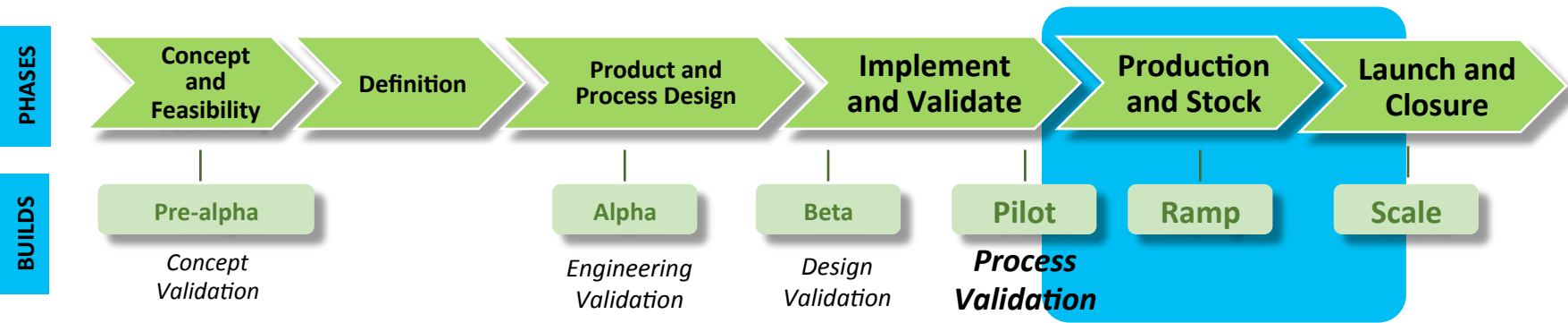


- Module 6 discusses the regulatory, certification, and quality needs of your product: (cont.)
  - Module 6B:** covers certain industries that may have more regulatory requirements, and how to comply
  - Module 6C:** describes how to translate customer inputs into regulatory and certification needs and how to use benchmarking to determine regulation and certification



# Regulation/Industry Standards

## Module 6 (cont.)

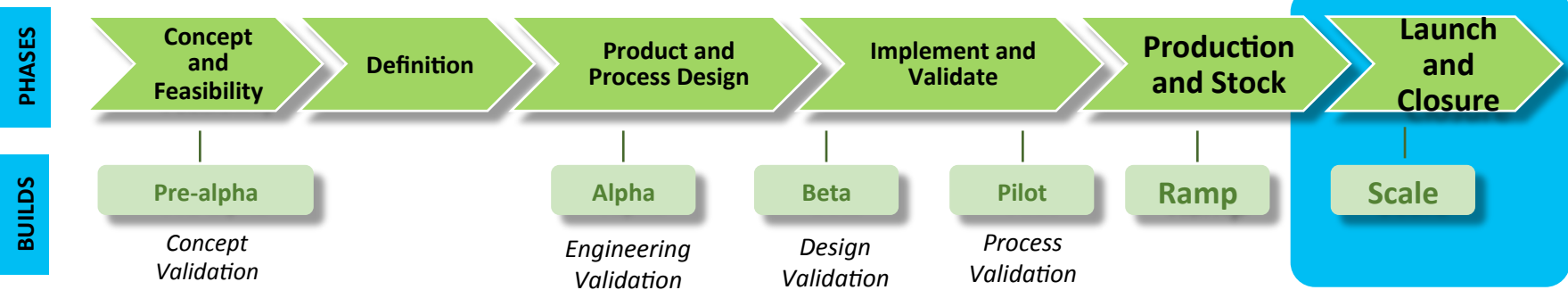


□ Module 6 discusses the regulatory, certification, and quality needs of your product: (cont.)

—**Module 6D:** describes how to determine what various manufacturing processes can do, and how to ensure that they're capable of consistently meeting customer needs

# Sustaining Quality And Growth

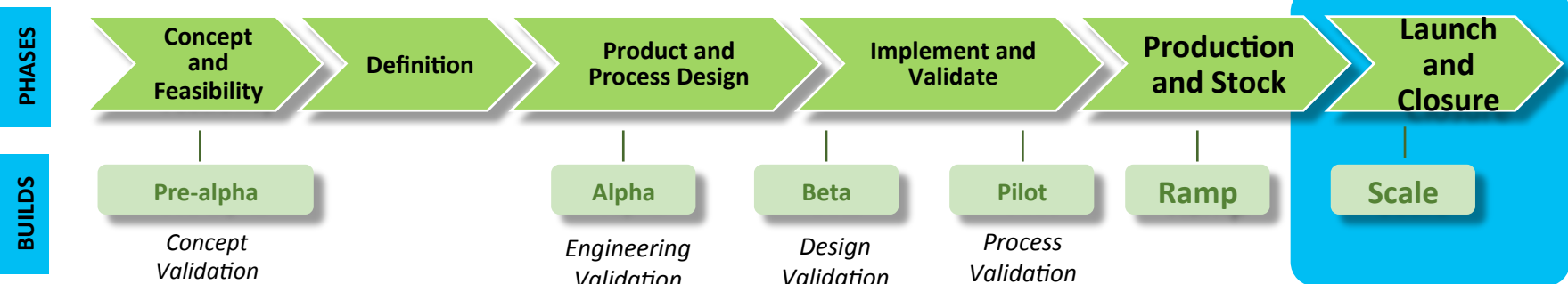
## Module 7



- Module 7 covers how to sustain and grow your business
- This module describes how to consistently provide quality products to your customers, deal with any quality issues, and grow your business:
  - Module 7A:** discusses how to ensure that you (and your suppliers) are consistently producing products that meet your customers' needs

# Quality And Warranty Plan

## Module 7 (cont.)



- Module 7 covers how to sustain and grow your business: (cont.)
  - Module 7B:** explains how to identify and resolve potential issues as your business grows and production increases
  - Module 7C:** discusses methods for capturing customer data and how to replace products that don't meet their expectations
  - Module 7D:** discusses how different cost categories grow with your business and how to fund that growth